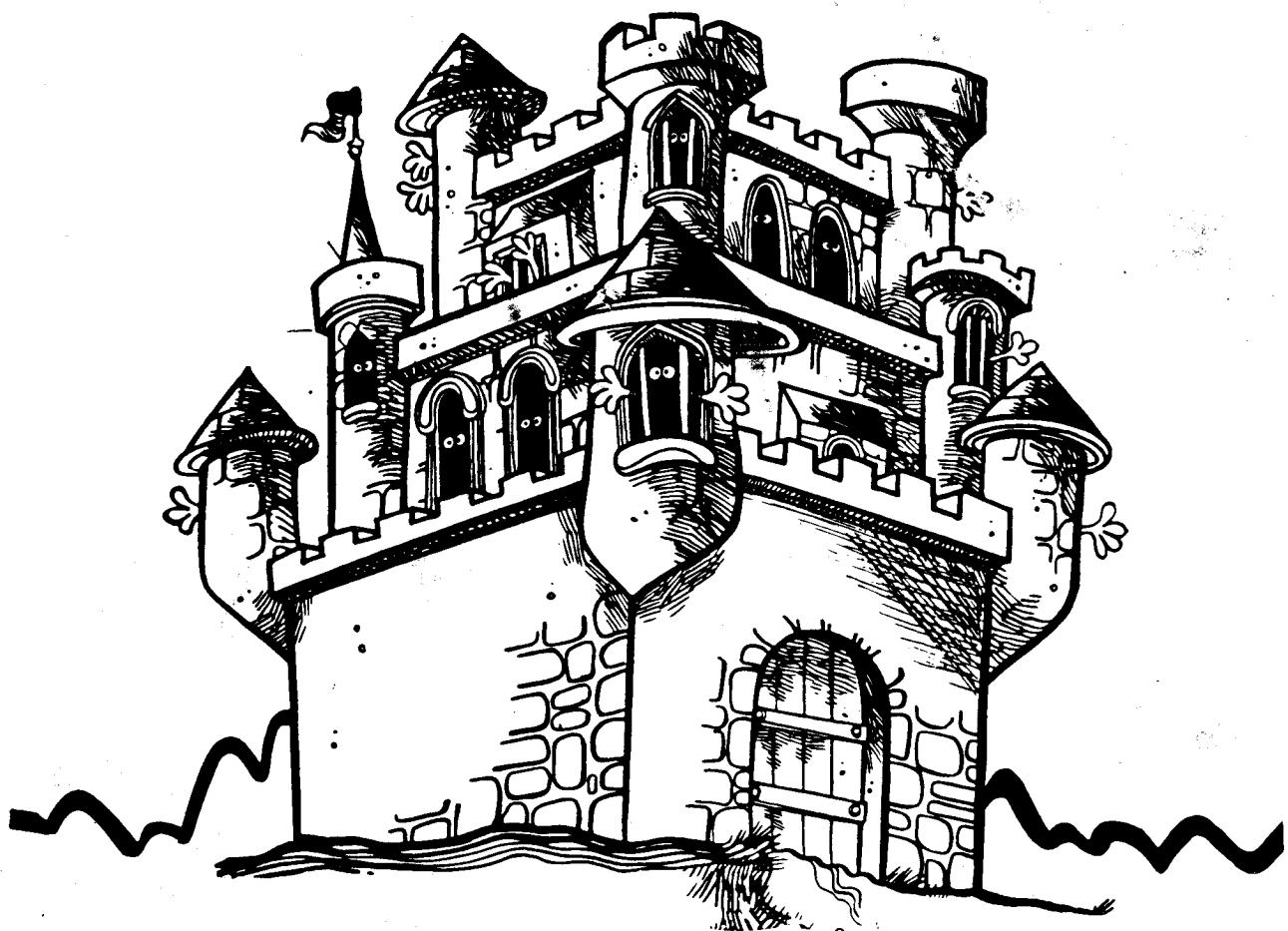




Service Manual



UNIVERSAL®

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SPECIFICATIONS

TABLE TYPE	UPRIGHT TYPE
564 m/m (D) AC100V/115V/230V	800 m/m (D) AC100V/115V/230V
863 m/m (W) 50/60Hz	640 m/m (W) 50/60Hz
570 – 680 m/m (H) 140W (18")	1750 m/m (H) 180W (20")
▼ 95-2447	▼ 95-1653

I. HOW TO PLAY

1. Operate Mr. Do! by means of the lever.
2. After dropping a block by use of the hammer, skillfully drop the unicorn into the hole. Then drop the block onto the unicorn and you can exterminate it.
3. You can also exterminate the unicorn by dropping a block onto it while it is walking.
4. You can hit and knock over a unicorn by use of the hammer in scenes 1 and 2.
5. Make good use of the skull blocks, and you can wipe out several unicorn at a time. When dropping both skull blocks, the blocks between them will also drop at the same time.
6. Only Mr. Do! can remove the ladder.
7. If Mr. Do! has been trapped between two unicorns on the blocks, you can help him escape by dropping a block with the hammer.
8. When three of the key blocks have been dropped, the door on the top level will open and a shield will appear. If you wipe it out the unicorns will change to EXTRA.
9. You can exterminate EXTRA by hammering it or dropping Mr. Do! on it. When it has been wiped out, a flag will be run up on the pole.
10. Another Mr. Do! will appear if you succeed in running up five flags, E X T R A on the pole.
11. The last unicorn in scenes 1 and 2, will change and split into the blue unicorns after 20 seconds – after a further 25 seconds, the blue unicorns will split into double unicorns, and then after another 5 seconds these will become eight – there will be no further increase.
12. Red unicorns will become green if Mr. Do! hits them four times with the hammer, and green unicorns will become blue when he hits them once with it.

ASSAULTING		SCORE	
When walking	When in the hole		
		 500~ 2,500 pts
		 20 pts
		 1,000~ 5,000 pts
		 1,500~ 8,000 pts
		 1,500~ 7,500 pts
		 500~ 2,500 pts

II. VARIOUS OPTIONAL SETTINGS

DESCRIPTIONS OF DIP SWITCHES

- Dip Switch A

1. Number of Mr. Do! Given (SW1, 2)

No. of Mr. Do!	SW1	SW2
3	OFF	OFF
4	OFF	ON
5	ON	OFF
2	ON	ON

2. Game Style (SW3)

Style	SW3
Table	OFF
Upright	ON

3. Difficulty of EXTRA (SW4)

Difficulty	SW4
Easy	OFF
Difficult	ON

4. SW5 is not used.

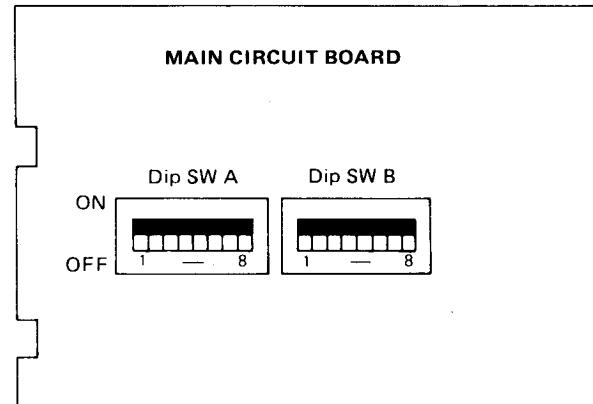
5. Automatic Renewal of Screen (SW6)

Automatic renewal	SW6
Made	OFF
Not made	ON

6. Difficulty of the Games (SW7, 8)

Difficulty	SW7	SW8
1 (Beginner)	OFF	OFF
2	OFF	ON
3	ON	OFF
4 (Advanced)	ON	ON

- Positions of Dip Switches



- Dip Switch B (Coin & Credit)

Coin	Credit	Left-side chute				Right-side chute			
		SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
1	1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	.2	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
1	3	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
1	4	OFF	OFF	ON	ON	OFF	OFF	ON	ON
1	5	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
2	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
2	3	OFF	ON	ON	OFF	OFF	ON	ON	OFF
3	1	OFF	ON	ON	ON	OFF	ON	ON	ON
3	2	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
4	1	ON	OFF	OFF	ON	ON	OFF	OFF	ON
1	1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
1	1	ON	OFF	ON	ON	ON	OFF	ON	ON
1	1	ON	ON	OFF	OFF	ON	ON	OFF	OFF
1	1	ON	ON	OFF	ON	ON	ON	OFF	ON
1	1	ON	ON	ON	OFF	ON	ON	ON	OFF
Free play		ON	ON	ON	ON	ON	ON	ON	ON

Standard and Custom Price Settings

The game price set by a combination of dip SWs is displayed on the monitor when coin credit is 0.

- When the settings for right and left chutes are the same, "1 coin – 1 credit", "2 coins – 3 credits", etc. are displayed.
- When the settings for right and left chutes are provided differently, their respective contents can be displayed.

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Dip switch A	1	0	1	1	0	1	1	1
" B	1	1	1	1	1	1	1	0

(5) TV Monitor Test:

Cross hatch pattern will appear on the entire screen. Monitor adjustment can be done by means of the pattern.

- Self-testing will stop at this point. Turn ON power again when you want to resume game or execute self-test again.
- * In case you have found any abnormality as a result of the self-test, contact the dealer who sold the machine to you.

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IV. MAIN CIRCUIT BOARD IC LOCATION AND PARTS LIST

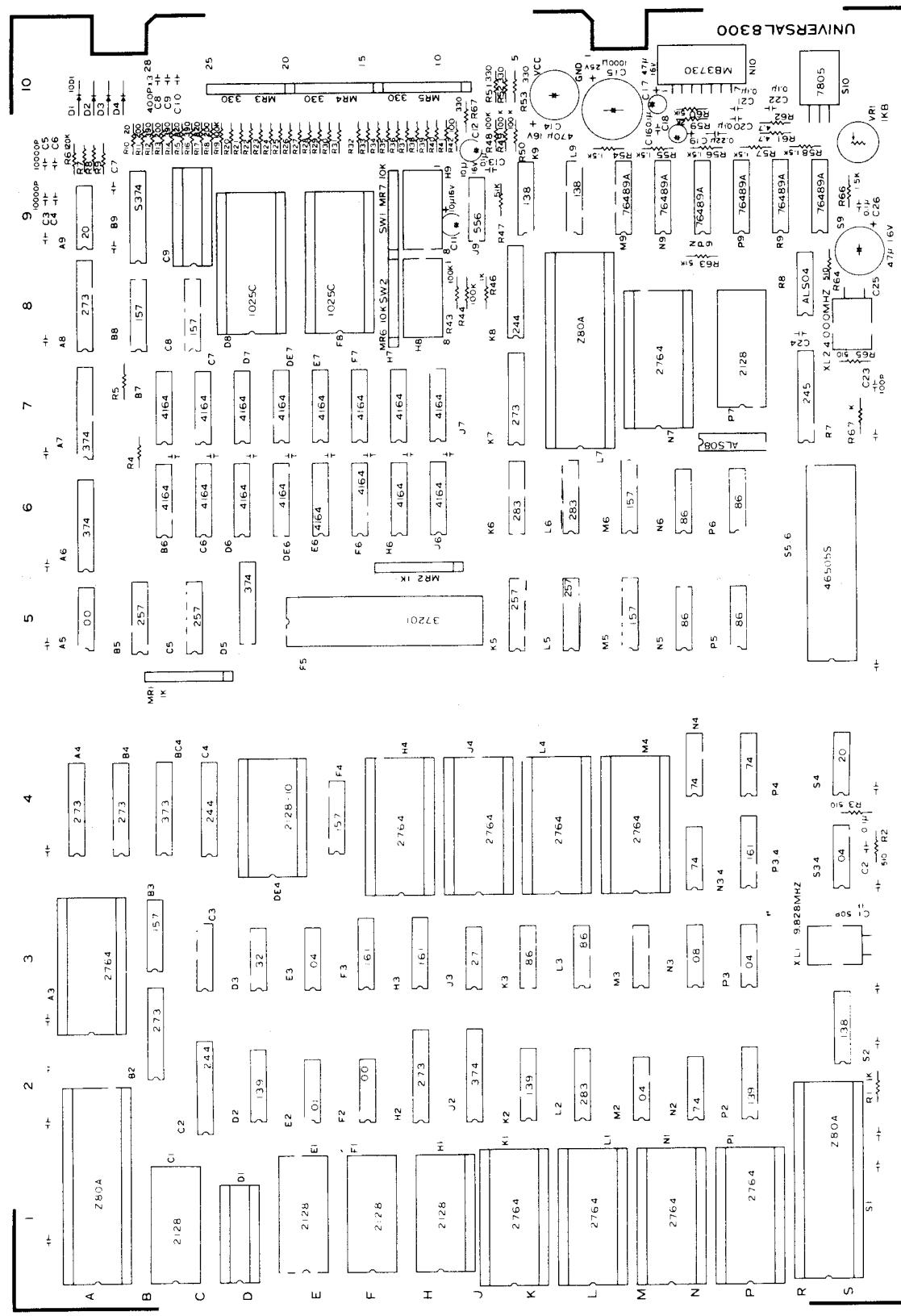


Fig. 1 Main Circuit Board IC Location

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[1] Integrated Circuit

Item No.	Q'ty	Description
74LS 00N	2	TTL
74LS 01	1	"
74LS 04	4	"
74LS 08	1	"
74LS 20	2	"
74LS 27	1	"
74LS 32	1	"
74LS 74	5	"
74LS 86	7	"
74LS138	3	"
74LS139	3	"
74LS157	6	"
74LS161	3	"
74LS244	3	"
74LS245	1	"
74LS257	4	"
74LS273	6	"
74LS283	3	"
74LS373	1	"
74LS374	4	"
74ALS04N	1	"
74ALS08	1	"
74S374N	1	"
Z80A	3	NMOS CPU (4MHz)
2764-300	8	NMOS 64K bits EP ROM (Access 300nsec)
27128-300	2	NMOS 128K bits ROM (Access 300 nsec)
N82S147	2	4096 bits Fuse ROM
TMS4164-200	16	64K DRAM
MB8128-150	5	NMOS 16K bits Static RAM (Access 150nsec)
MB8128-100	1	NMOS 16K bits Static RAM (Access 100nsec)
CF37201N	1	Custom Function
NE556	1	Timer
MB3730	1	Audio Amplifier
SN76489AN	4	Programable Sound Generator
TMS1025N2CL	2	CMOS
HD46505SP	1	CRTC
10D1	4	Diode
UA7805	1	Regulator

[2] Capacitors

Rating	Q'ty	Description
0.1 μ F16V	22	Ceramic Capacitor
0.1 μ F25V	3	"
0.001 μ F25V	4	"
400PF50V	3	"
100PF50V	1	"
50PF50V	1	"
47 μ F16V	1	"
10 μ F16V	2	"
22 μ F16V	1	"
47 μ F16V	1	"
470 μ F6.3V	1	"
0.22 μ F16V	1	ES Capacitor
1000 μ F16V	1	"

[3] Registers

Rating	Q'ty	Description
4.7 Ω	2	Carbon Solid
20 Ω	1	"
100 Ω	1	"
200 Ω	3	"
330 Ω	4	"
390 Ω	3	"
510 Ω	4	"
820 Ω	2	"
1K Ω	3	"
1.5K Ω	4	"
2K Ω	1	"
22K Ω	1	"
5.1K Ω	1	"
100 Ω	28	"
120 Ω	4	"
51 Ω	1	"
330 x 8	3	Resistor Array
1K x 8	2	"
10K x 8	2	"
1K Ω B	1	"

[4] Misc

Name	Q'ty	Description
Dip SW	2	8 Elements Switch Array
X tal	1	9.828MHz
"	1	4.000MHz
20P	2	IC Socket
28P	10	"

This drawing provides standard information.
Universal reserves the right to change without notice.

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V. WIRING DIAGRAM (CONNECTOR)

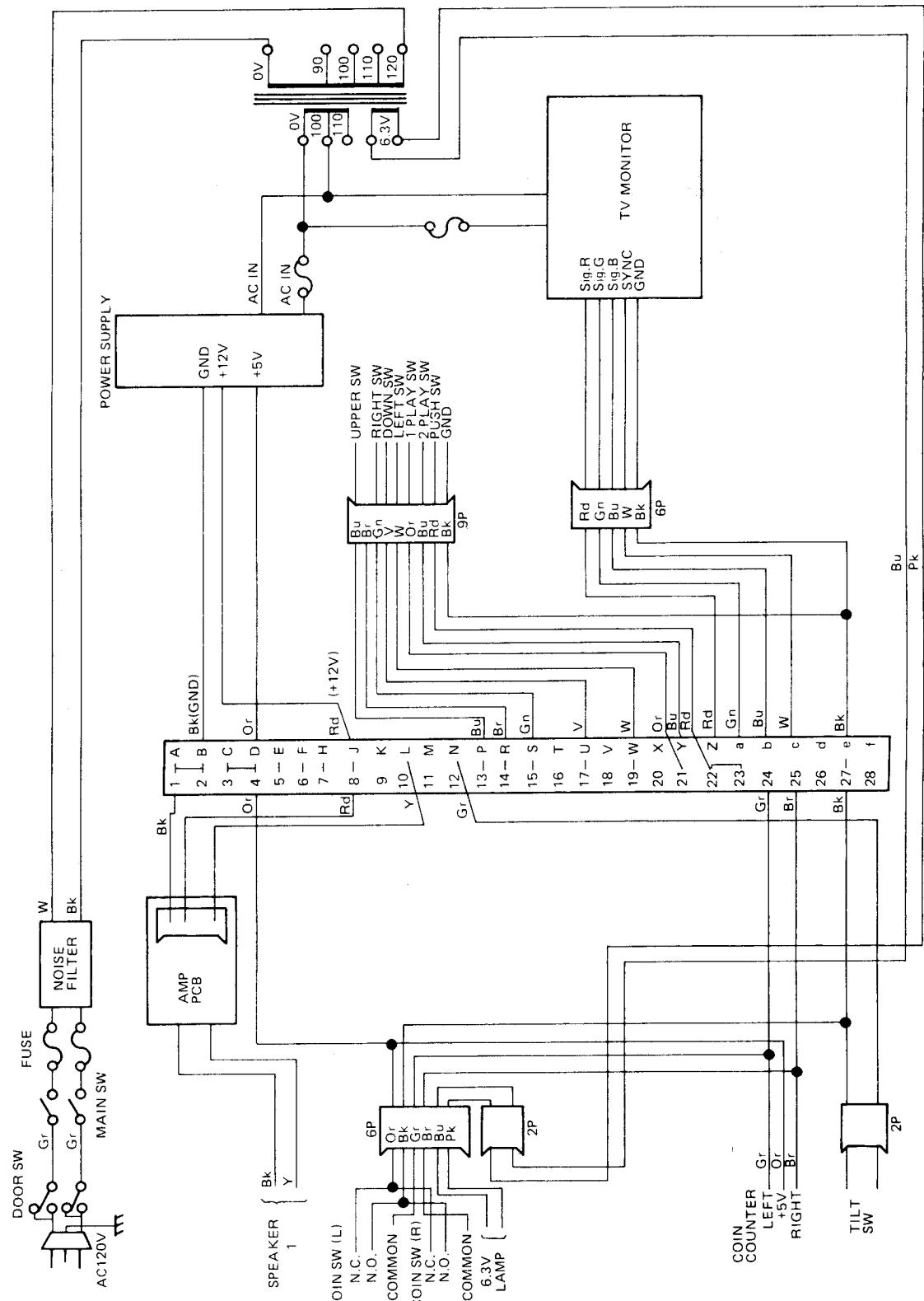
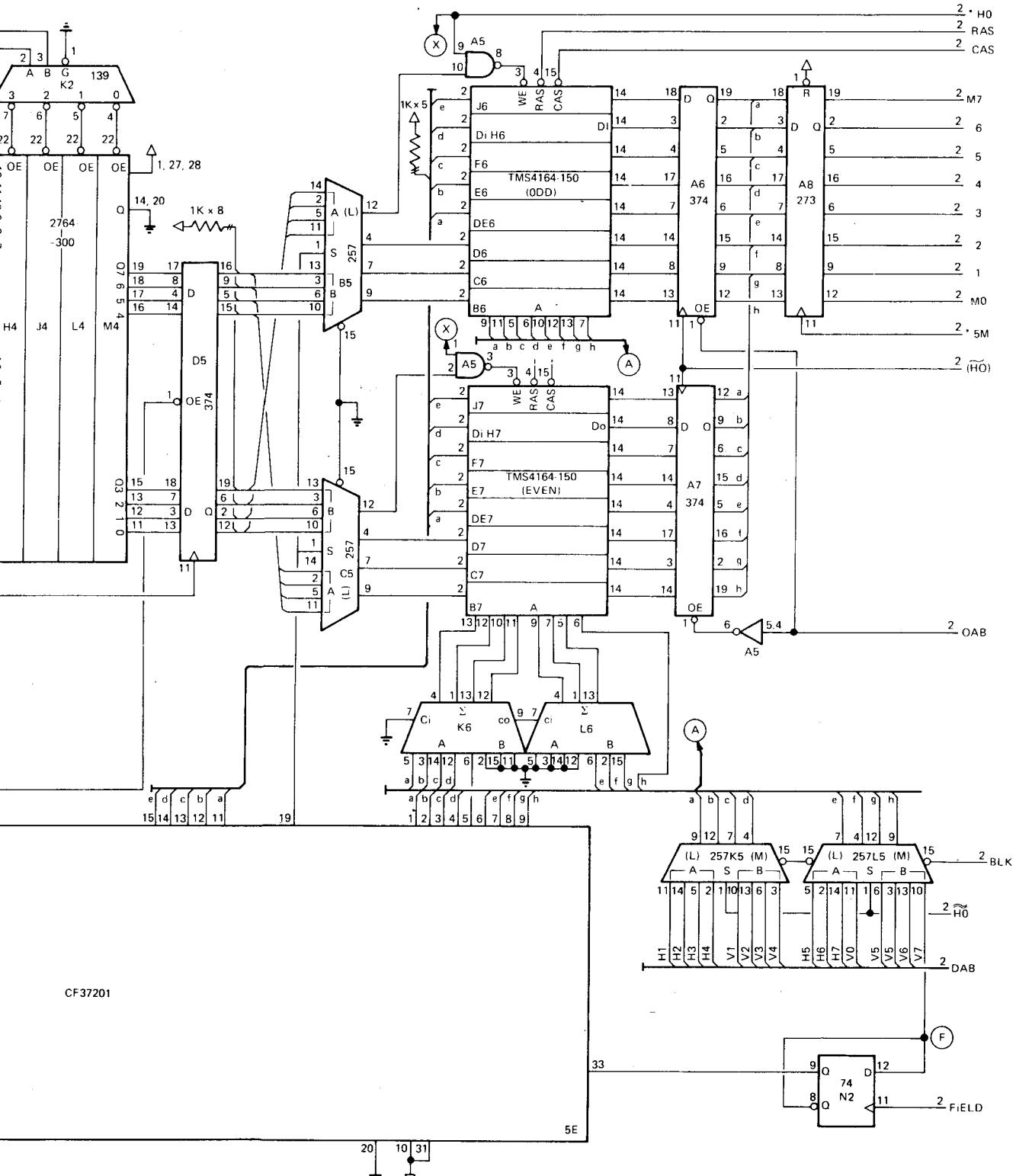


Fig. 2 Wiring Diagram (Connector)



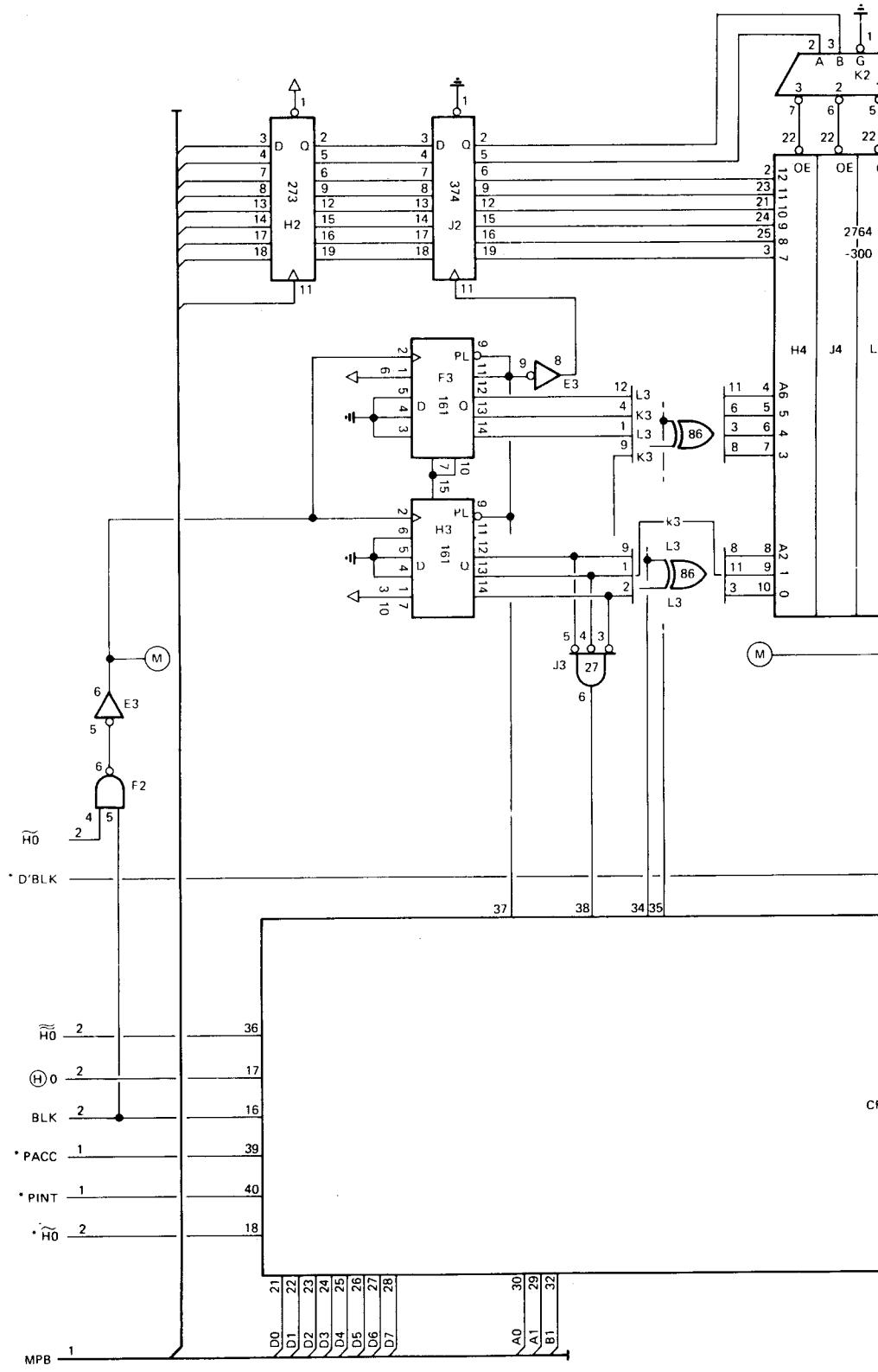
CF37201

Fig. 3 Main Circuit Board Schematic Diagram (No. 1)

Mr. Do's CASTLE

8302

VI. MAIN CIRCUIT BOARD SCHEMATIC DIAGRAM



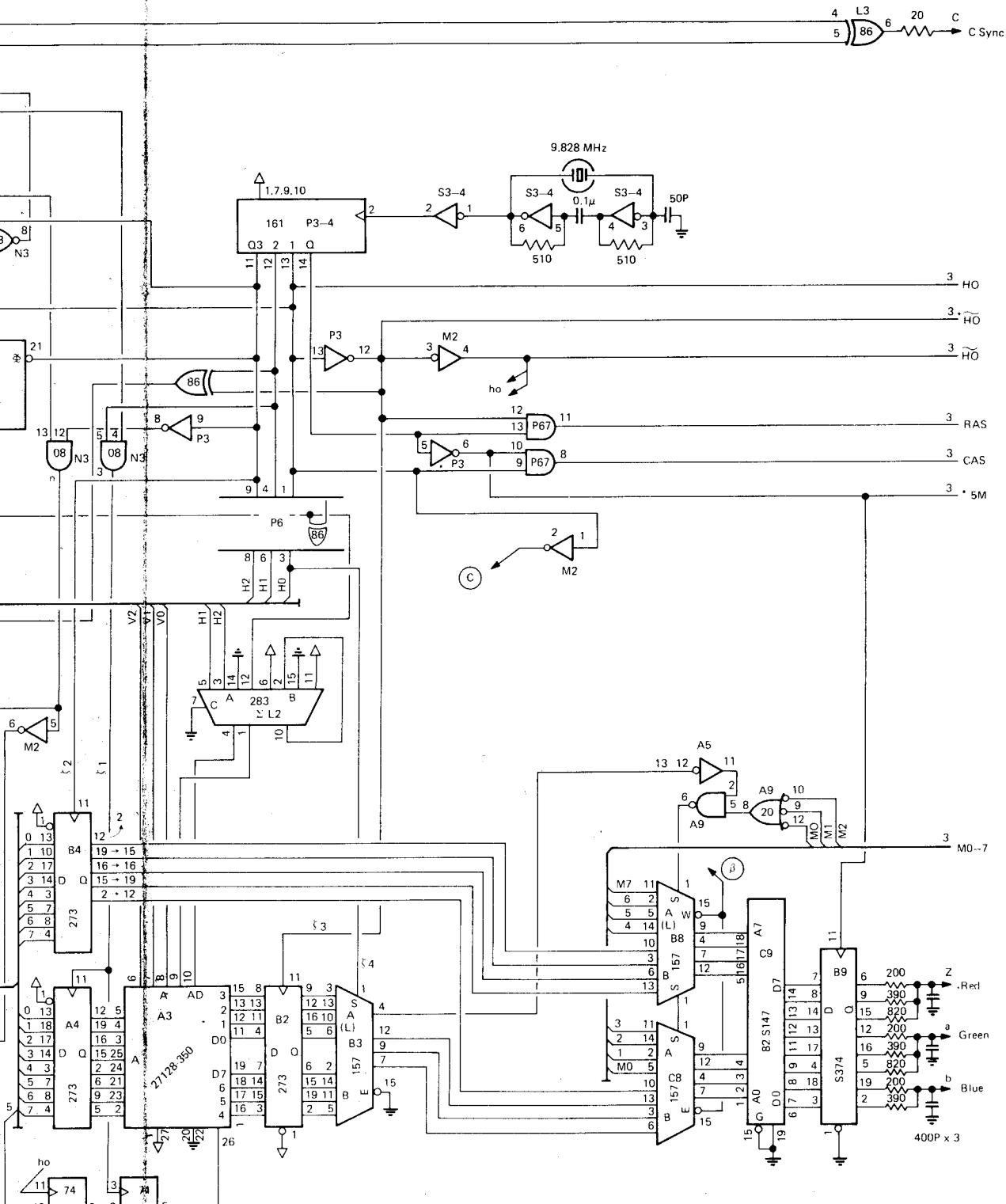
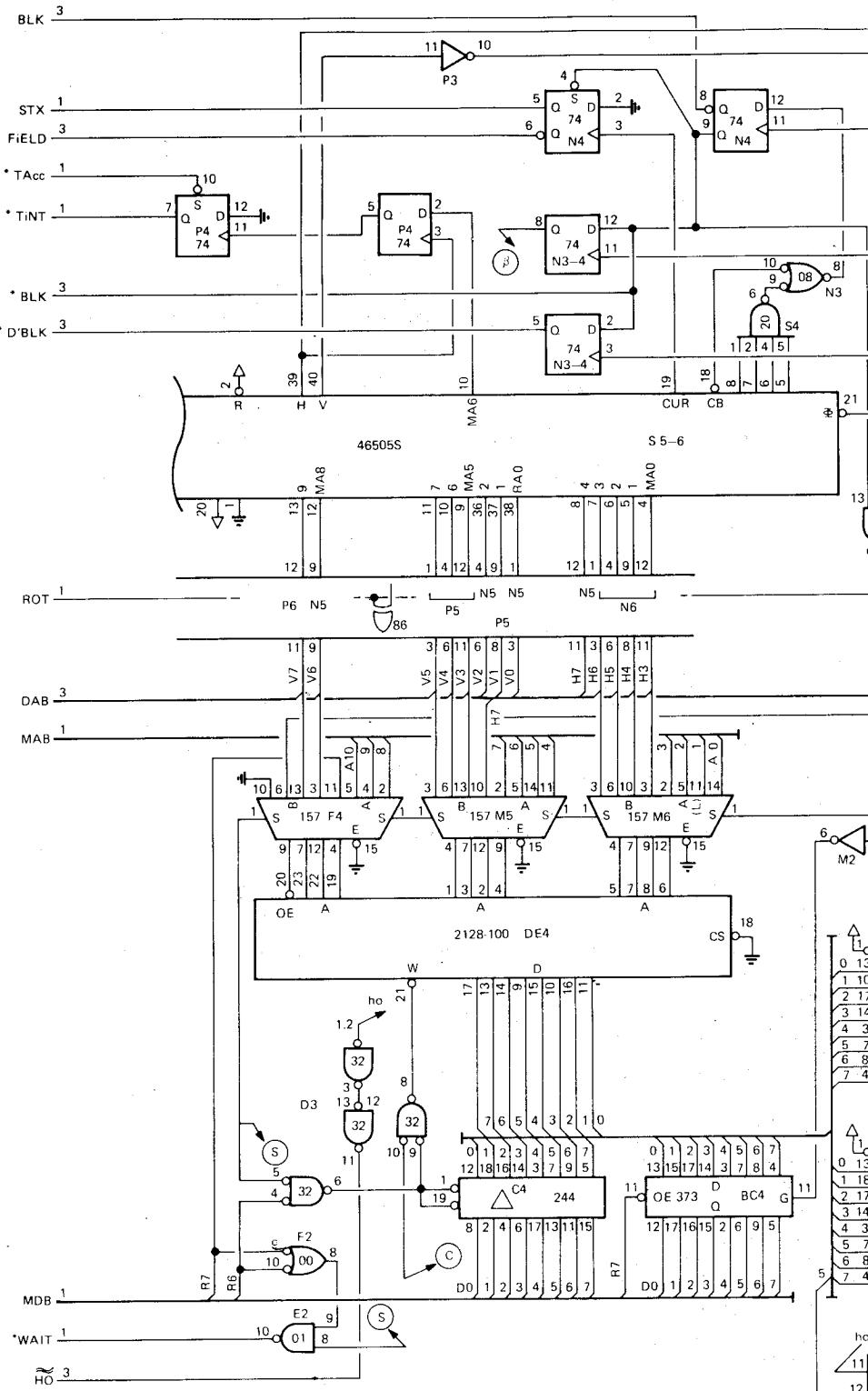


Fig. 4 Main Circuit Board Schematic Diagram (No. 2)



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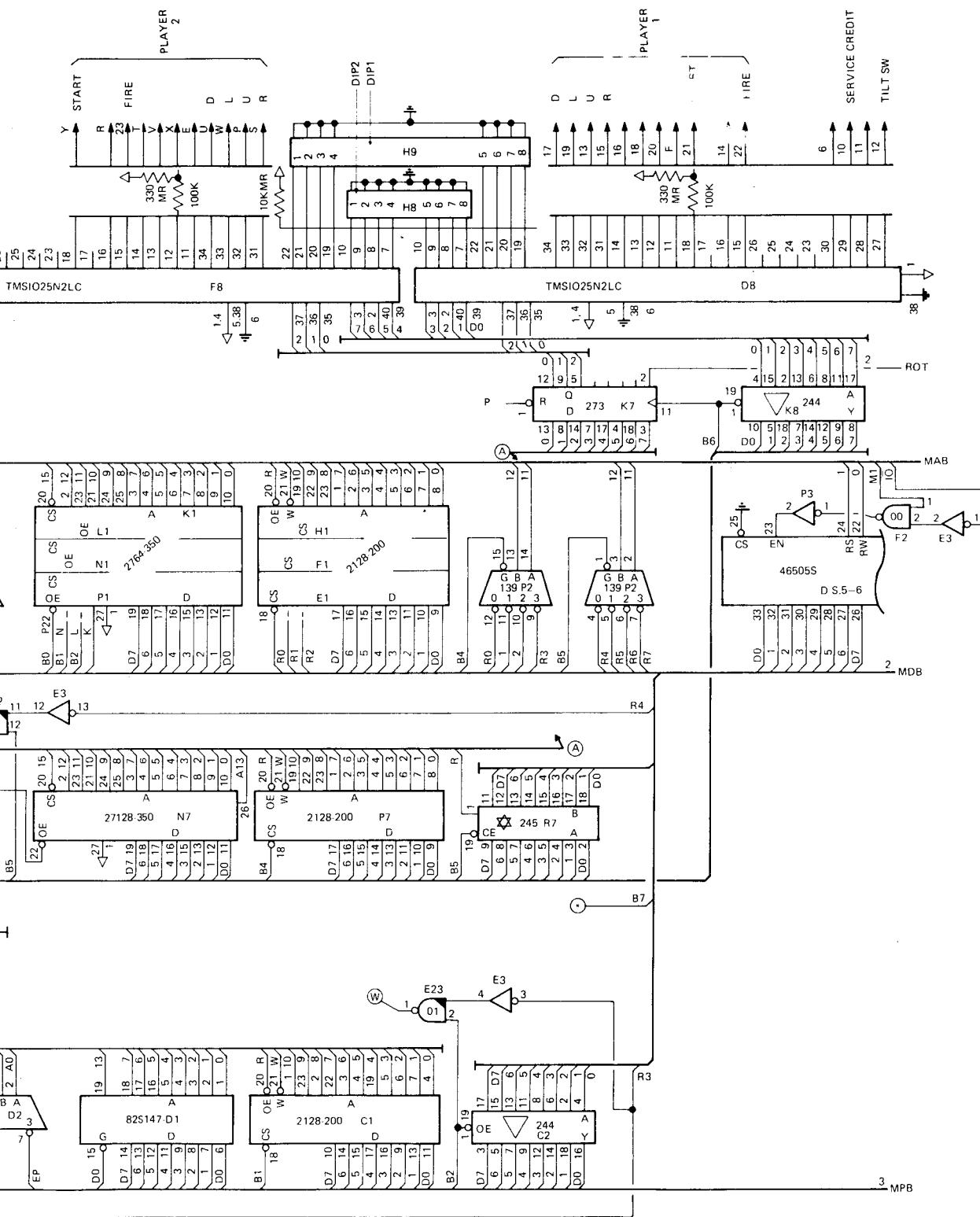
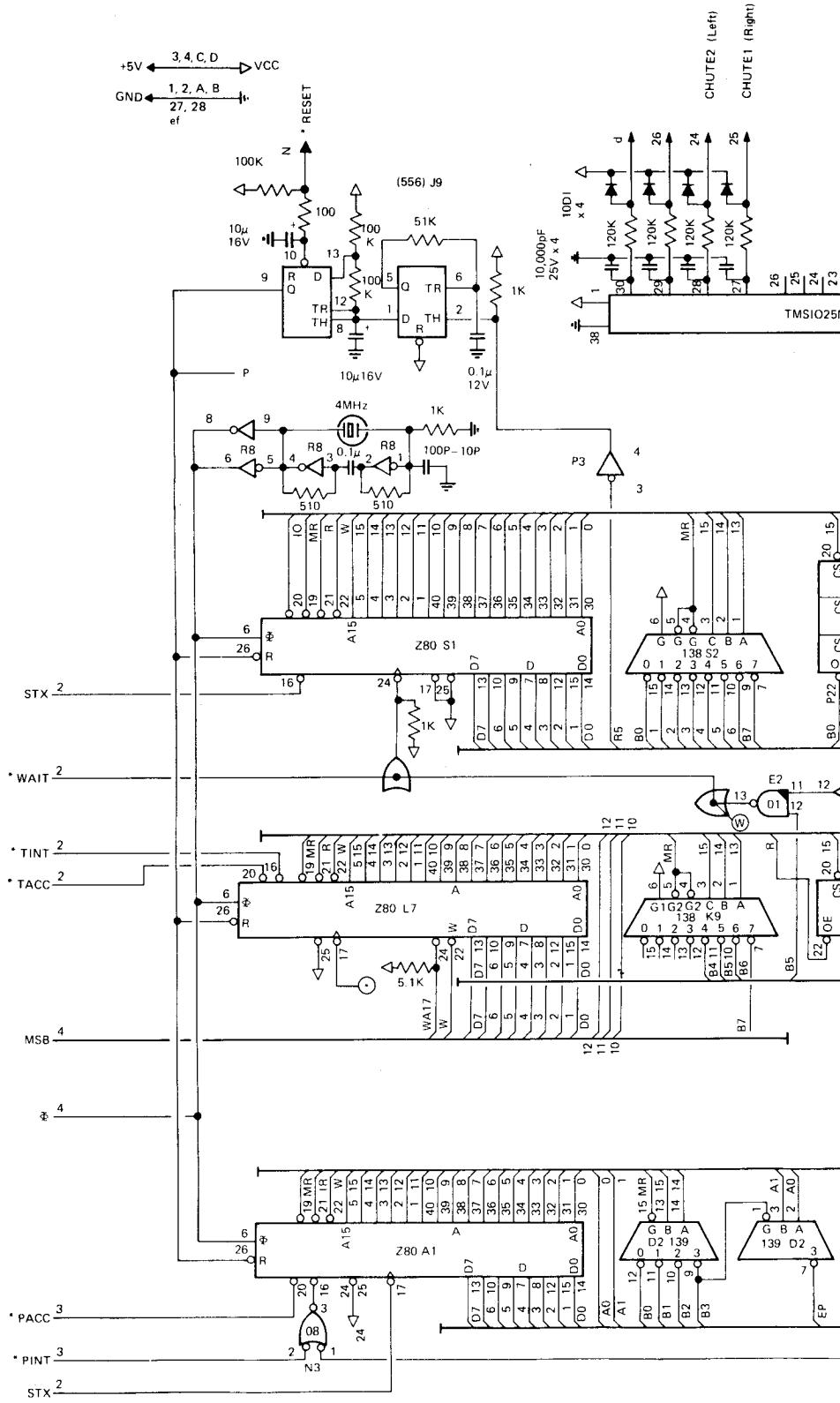


Fig. 5 Main Circuit Board Schematic Diagram (No. 3)

Mr. Do's CASTLE

8302



VII. BLOCK DIAGRAM

Mr. Do's CASTLE
8302

Fig. 6 Main Circuit Board Schematic Diagram (No. 4)

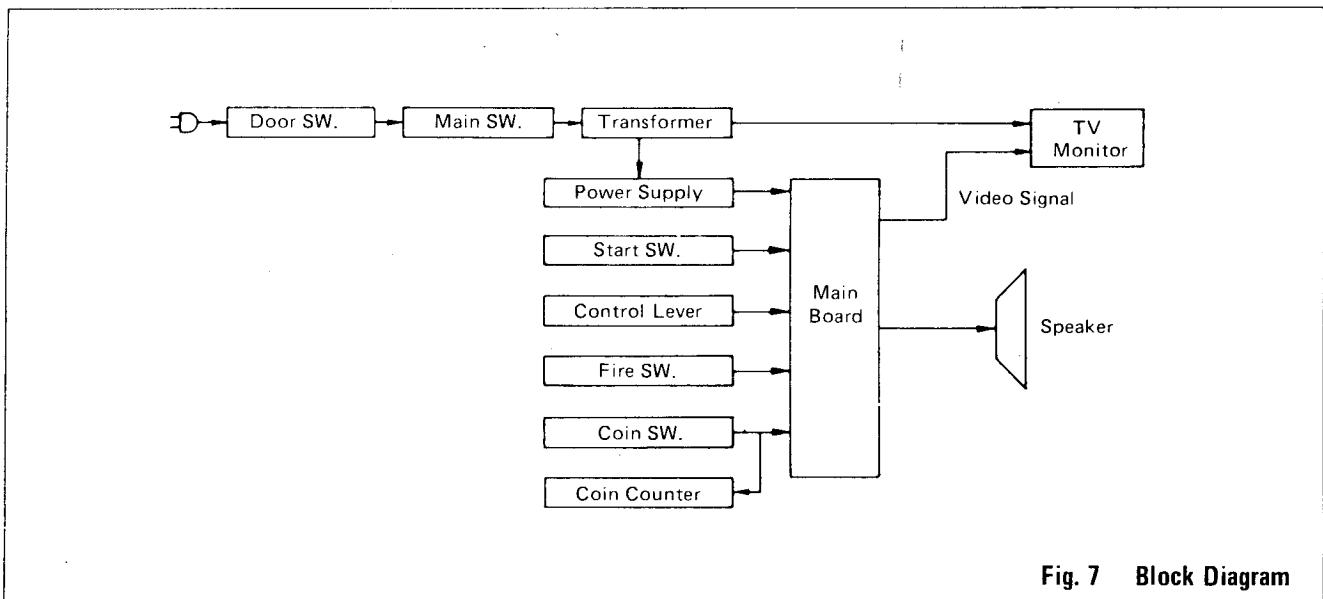
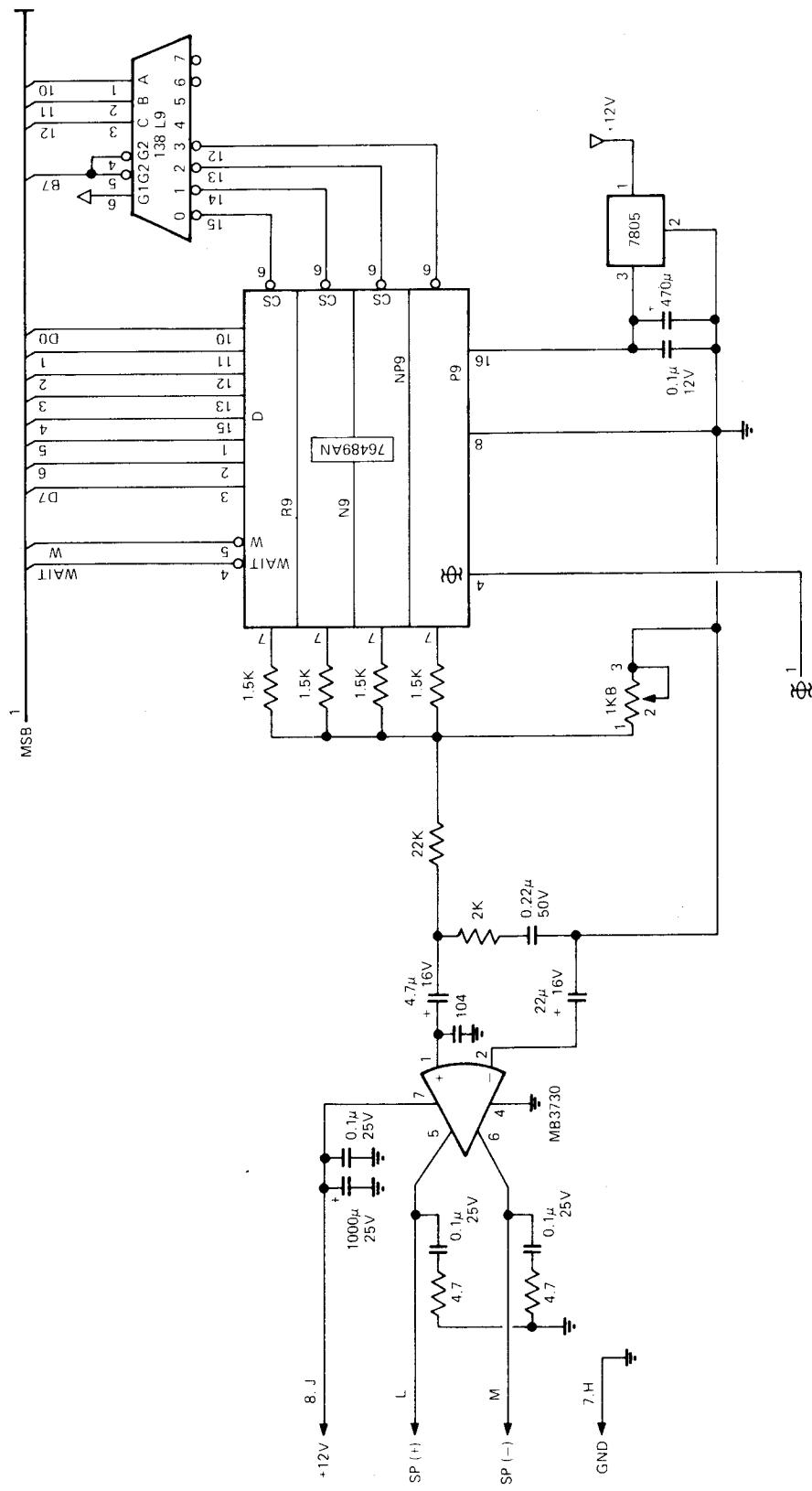


Fig. 7 Block Diagram



MR. DO'S CASTLE HARNESS PIN ASSIGNMENT

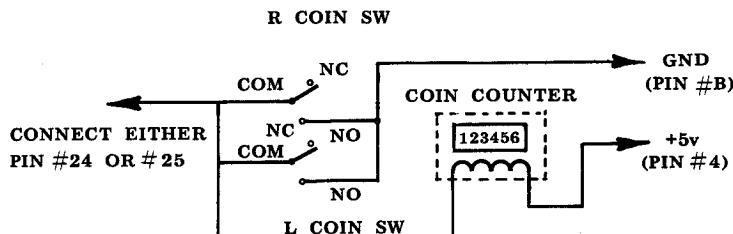
SOLDER SIDE

COMPONENT SIDE

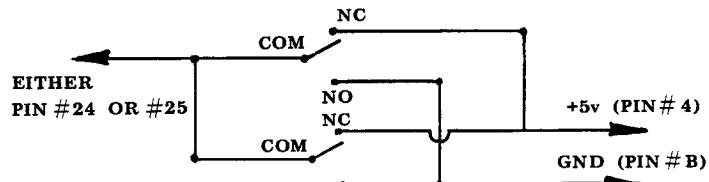
	USE	COLOR	COLOR
2nd PLAYER			
COIN SW	GND	Blk.	A 1
SLAM SW	GND	Blk.	B 2
			C 3
			D 4
			E 5
			F 6
			H 7
			J 8
			K 9
			L 10
			M 11
			N 12
			P 13
			R 14
			S 15
			T 16
			U 17
			V 18
			W 19
			X 20
			Y 21
			Z 22
			a 23
			b 24
			c 25
			d 26
			e 27
			f 28
FOR C. TABLE	SLAM SW	Grn.	
	2nd PLAYER UP	Blue	1st PLAYER UP
	2nd PLAYER RIGHT	Brn.	1st PLAYER RIGHT
	2nd PLAYER DOWN	Yel.	1st PLAYER DOWN
	2nd PLAYER LEFT	Pur.	1st PLAYER LEFT
TO MONITOR	2 PLAYERS SELECT	Grn.	1st PLAYER SELECT
	VIDEO RED	Red	1st PLAYER THROW
	VIDEO GREEN	Grn.	2nd PLAYER THROW (FOR C. TABLE)
	VIDEO BLUE	Blue	LEFT COIN SW/COUNTER X
	COMPOSIT SYNC	Wht.	RIGHT COIN SW/COUNTER
	GND	Blk.	

NOTE:

CONNECTION FOR USE WITH COIN METER

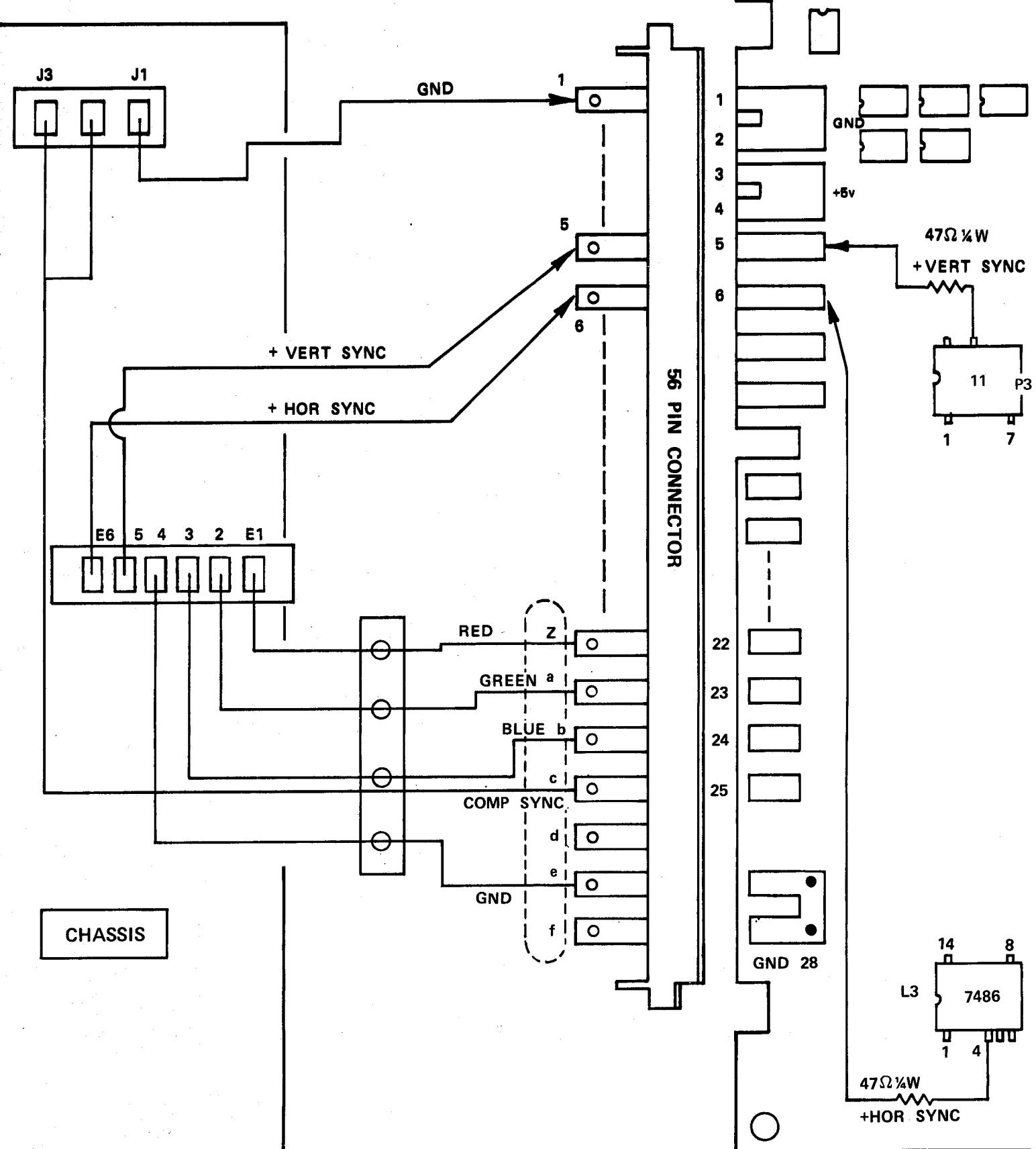


CONNECTION FOR USE WITHOUT COIN METER



MODIFICATION FOR POSITIVE HORIZONTAL AND VERTICAL OUTPUT

MR. DO'S CASTLE P.C.B.



* BE SURE TO REMOVE COMP SYNC LINE WHEN INSTALLING THE POSITIVE INDEPENDANT SYNC LINES.

NOTE: IN MOST CASES WHERE BY A SEPERATE HORIZONTAL AND VERTICAL NEGATIVE SYNC. PULSE IS NEEDED, THE COMPOSIT SYNC. SIGNAL CAN BE USED BY CONNECTING THE WHITE WIRE (PIN C) TO BOTH NEGATIVE HORIZONTAL AND VERTICAL INPUTS ON THE MONITOR CHASIS.